

Amesbury Middle School- Roof Assessment Report
220 Main Street, Amesbury MA 01913



Aerial Image #1: Overview of the Amesbury Middle School, located at 220 Main St. Amesbury, MA.

To: Mr. Matthew Bennett / Haverhill Housing Authority
Fm: Matthew Nolan / Tremco Roofing
Dt: December 8th, 2021

Re: Amesbury Middle School- Roof Assessment Report

Summary

During the month of December 2021, a preliminary roof assessment was completed at the Amesbury Middle School, located at 220 Main Street, Amesbury, MA. The initial assessment was completed due to extensive moisture intrusion issues reported by the Amesbury School Department staff. Previously, (2019) Tremco recommended completing a moisture analysis of the roof system(s) covering the school buildings operated by the Amesbury School District. Moisture testing was completed on the Amesbury schools, by the O'Brien Group in June 2021, and a snap shot of the results of the Middle School is provided in this report. The moisture testing results showed that approximately 15,000 sq. ft. of roof top insulation on the Middle School has been compromised by moisture intrusion at the time when the scan was completed. It is assumed that the locations of compromised insulation have grown since the summer months, as significant repair efforts were not evident during Tremco's inspection completed December 2021.

During the visual inspection completed in December 2021, the following areas were inspected.

- 6th Grade Wing- Main leaks are reported in the school library. Previous repairs were made around the skylights, but membrane noted to be deteriorating in this area.
- Performance Arts Center- The PAC has reportedly 18 active leaks ongoing at this time. The upper section has 10, while the lower area has 8. The TPO membrane is deteriorating at this time and significant moisture was noted on the infrared scan drawing (provided below- Model 1).
- Gym & Girls Locker Room- There is a significant leak over the Girls Locker room. There is low sloped roof area above the locker room that is ponding water. There are sections of membrane that have large splits. There are deteriorated shingles which is likely contributing to deteriorated structural decking & moisture intrusion concerns.
- 8th Grade Wing- The second floor on the 8th Grade wing reports leaks in every classroom. TPO membrane was found to be deteriorating over the entire roof area. Previous repairs have been made on this wing. Due to unadhered patch, enhancements to seams were made at patch in 2019.

After review of the infrared documents, and visual inspection of the existing TPO membrane, it is confirmed that the roof system covering the Middle School is in failure mode and full replacement is needed to help permanently solve the moisture intrusion concerns at the Amesbury Middle School.

TPO Membrane Failure

The reasons why we are indicating that the TPO (thermoplastic polyolefin) membrane has portions that are in failure mode are as follows:

- There are large sections of the membrane where the scrim of the TPO membrane is exposed. The scrim is the material that stabilizes the thermoplastic materials used to create the TPO waterproofing sheet. The thermoplastic waterproofing is installed over the scrim. Once the scrim is exposed, water travels on the scrim and bypasses the sheet.
- There are sections of the TPO membrane where it is so brittle, you can insert your finger through the membrane with very little effort. Typical foot traffic will cause additional cracking of the membrane, especially in colder weather.
- All locations where Versico black rubber walk-pads were installed on the roof have expedited the deterioration process of the TPO membrane. There are long splits that border the walk pad areas.

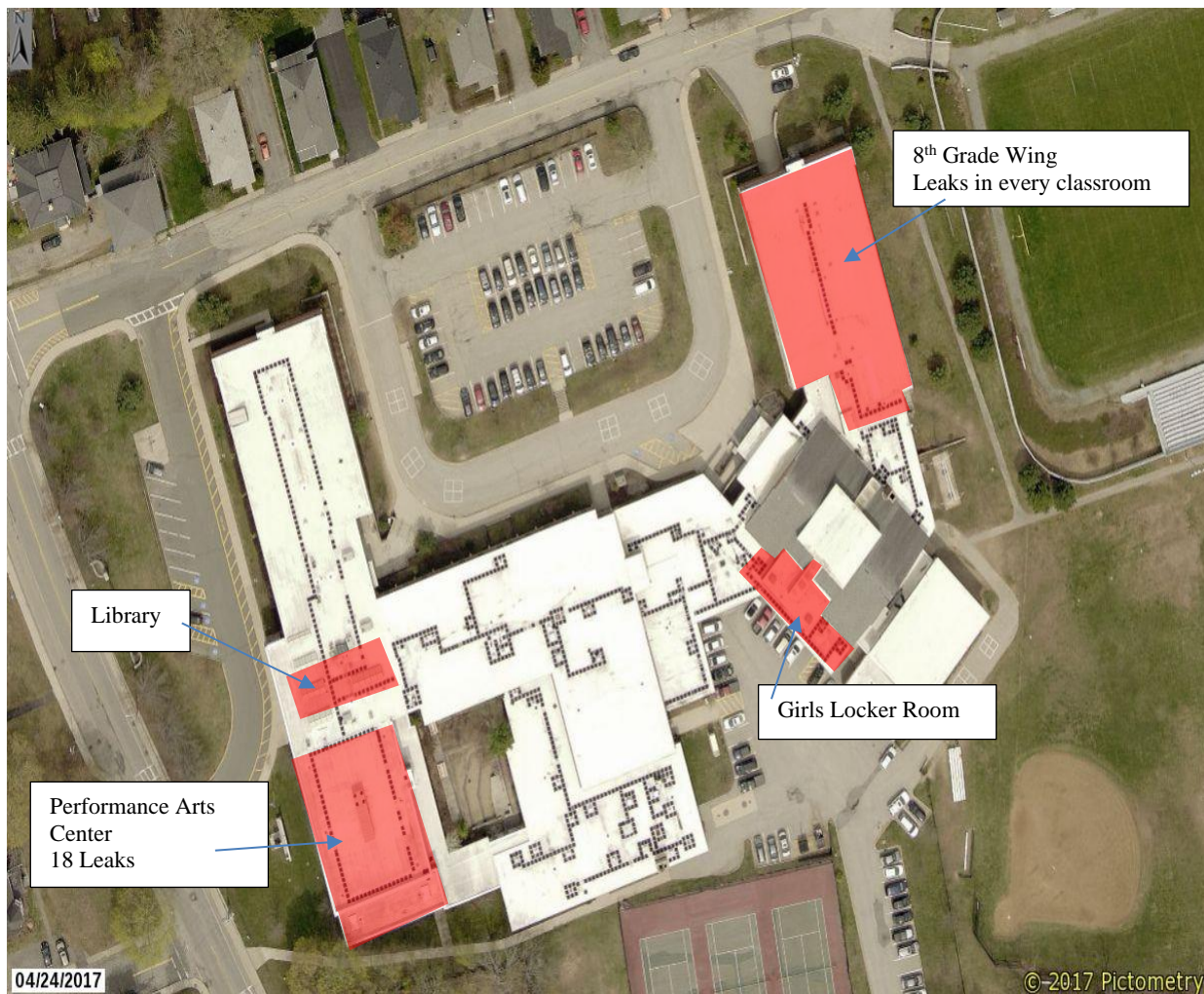
Repair Options

When considering repairs effort for the Middle School as a temporary/bridge effort as budgeting is found for full replacement, the roof areas outlined in Aerial Image #2 should be prioritized. Due to the condition of the membrane in the areas outlined, a considerable repair effort should be considered for each location.

- An overlay of membrane material (EPDM, TPO, PVC) requires that a sound substrate is available to either glue to/or heat weld to. Due to the brittle nature of the TPO membrane, glue to adhere an EPDM membrane does not bond well. This was evident in 2019 on the 8th Grade Wing, where a large EPDM repair patch was wide open at the edge of the patch.
- To patch areas using TPO material, this will require that the patches are heat welded to the existing deteriorated membrane. Due to the deterioration of the waterproofing over

the scrim, heat welding will prove difficult or impossible.

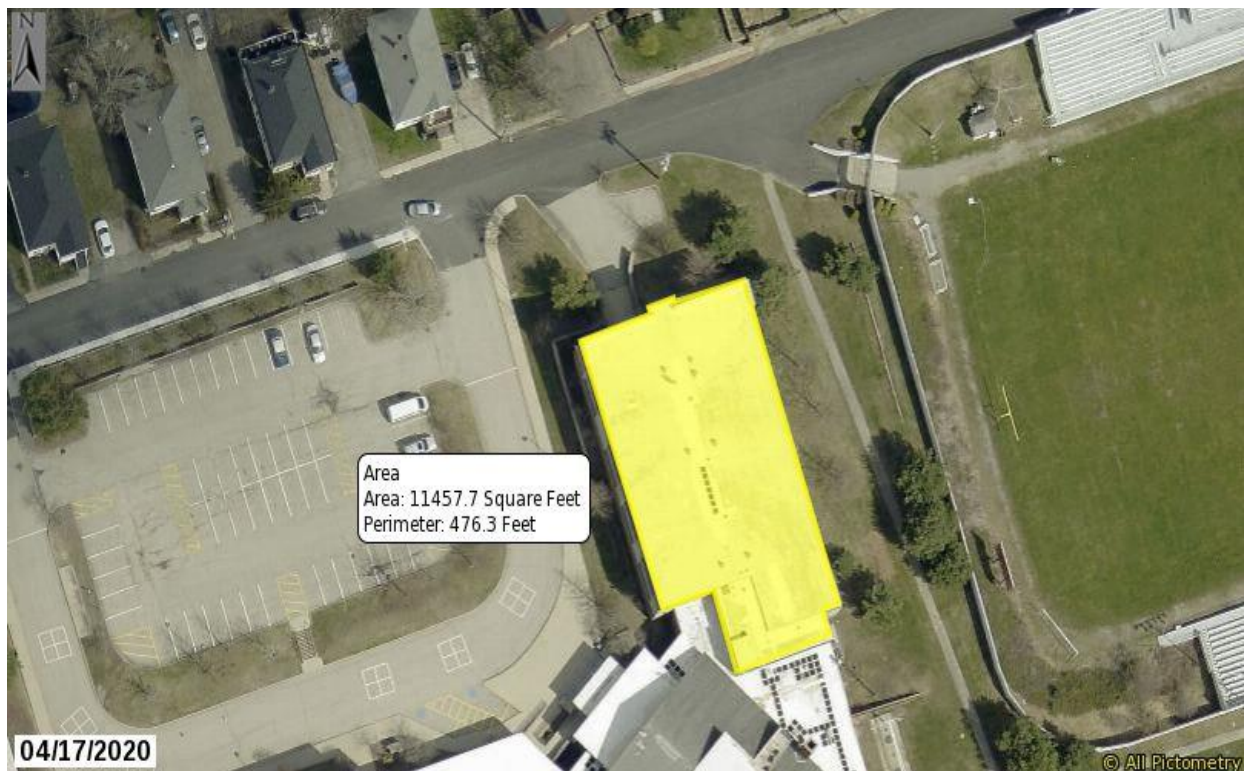
- Previous repairs made in 2020 were made with fluid applied material in centralized but minimal locations where leaks were most prevalent at that time. The fluid applied material bonded well to the deteriorated TPO membrane.
- A fluid applied repair solution is recommended for repair efforts. In order to provide a 2–5-year fix, a material called AlphaGuard MT Base Coat should be considered. This material requires that the membrane is cleaned, primer installed, and then urethane base coat material applied to selected locations at 3 gallons per 100 sq. ft. Reinforcement fabric is installed in the wet base coat, providing superior, self-terminating waterproofing.
- As an estimate, (2) qualified technicians can install approximately 800 sq. ft. per day of this repair method. It is important to determine which areas are of highest priority to address.
- The warrantable method of fluid applied material includes the removal of all compromised/wet insulation, new membrane installed, and base and top coat installed. Due to the extent of insulation compromised, this could be considered, but it would be a major capital project.



Aerial Image #2: Outlined areas on low sloped roof where membrane was witnessed deteriorating, and leaks reported. The areas also coincide with locations of moisture intrusion noted on infrared scan.



Model #1: Drawing of compromised insulation by the O'Brien Group.



Aerial Image #3: Overview of 8th Grade Wing.



Photo #1: Overview of 8th Grade Wing.

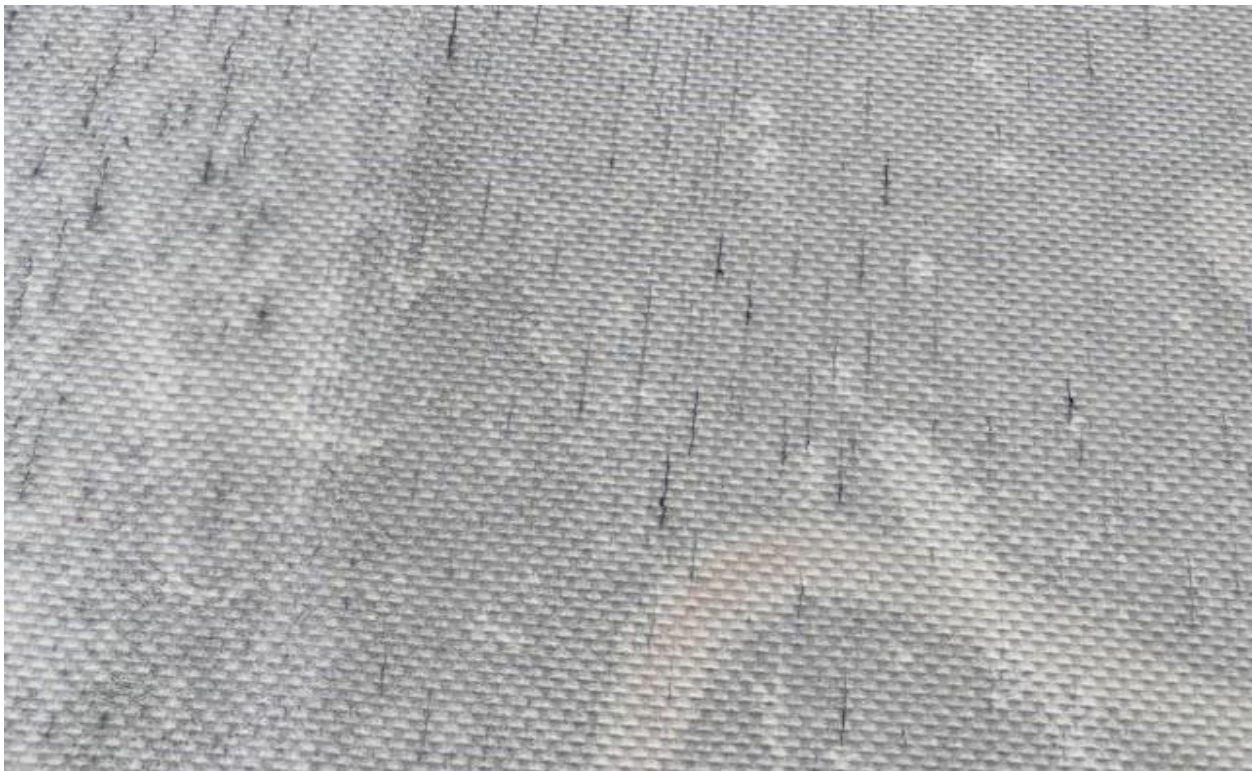
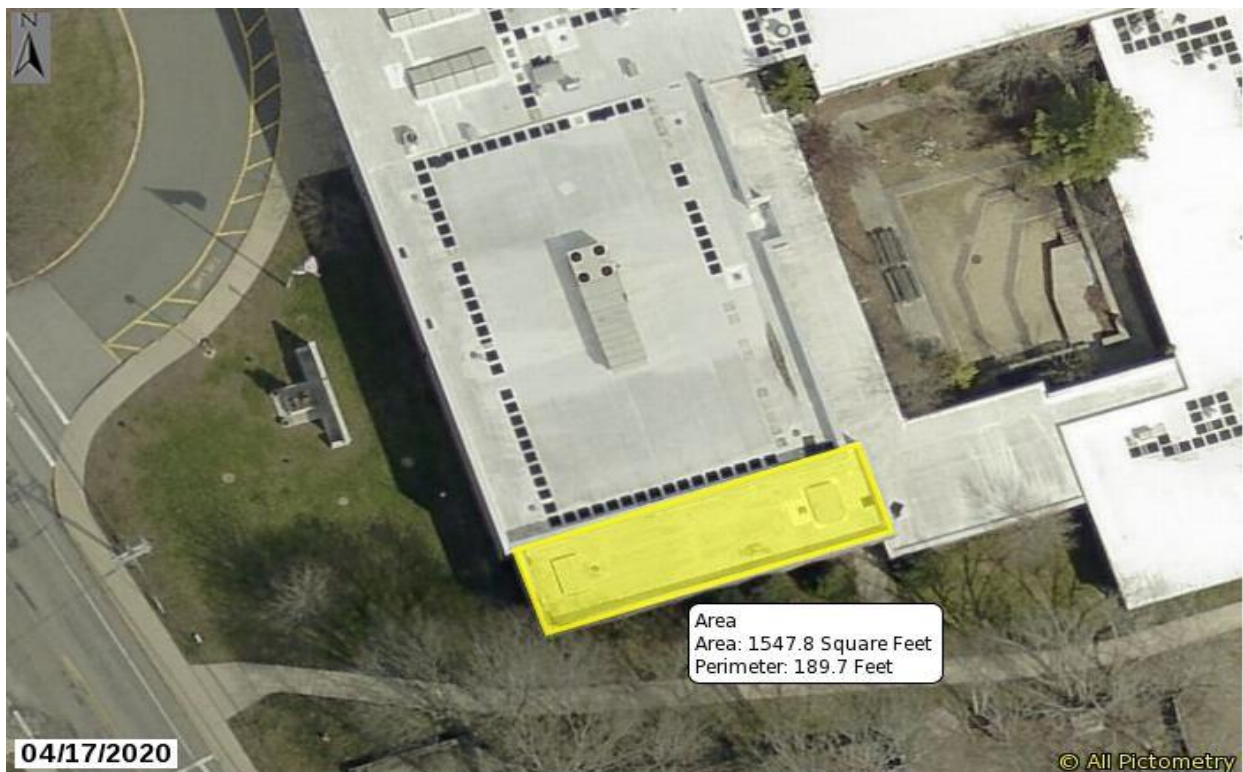


Photo #2: The TPO membrane installed on the 8th Grade Wing is brittle and cracked. The membrane will continue to deteriorate if left exposed.



Photo #3: Close up photo of the deteriorated TPO membrane.



Aerial Image #4: Low roof on the Performing Arts Center.



Photo #4: Overview of the low roof on the Performing Arts Center.



Photo #5: Overview of the deteriorating membrane on the low roof on the PAC. Simply running your finger over the membrane will expose the scrim of the waterproofing system.



Aerial Image #5: Overview of the upper roof of the Performing Arts Center.



Photo #6: Overview of the deteriorated membrane on the upper roof of the PAC.



Photo #7: Overview of the deteriorated membrane on the upper roof of the PAC. The membrane is so brittle, that typical foot traffic can puncture the membrane.



Photo #8: The membrane is badly deteriorated and will continue to fall apart if not treated with waterproofing.



Aerial Image #6: Overview of the low sloped roof areas over the Gym that are ponding water, have deteriorating membrane, and are likely contributing to moisture intrusion issues inside the facility.



Photo #9: Internal moisture damage inside the gymnasium.



Photo #10: Internal moisture damage inside the girl's locker room.



Photo #11: Internal moisture damage inside the girl's locker room.



Photo #12: Internal moisture damage inside the girl's locker room penthouse.



Photo #13: The black non-slip walk-pads have expedited the breakdown of the TPO membrane in the locations where they were originally installed.



Photo #14: Example of deteriorated seam at edge of walk-pad.



Photo #15: The ponding water on the low-sloped roof portions over the gym with help expedite the deterioration of the TPO membrane.



Photo #16: Missing metal edge fascia and wall cladding has compromised wood blocking at a severe leaking location showing up inside the gymnasium.



Photo #17: All the singles on the gymnasium should be replaced. There is a 15' x 25' section that is in terrible shape and should be replaced as soon as possible.

Scope of Work- Amesbury Middle School- Selected Locations:

- Prioritize locations where fluid applied material to be installed. (800 sq. ft. per (2) man days of labor).
 - Due to the deteriorated nature of the existing TPO membrane in certain locations, power washing the membrane may destroy the membrane. Any location where fluid applied material is to be applied should be cleaned and dried to provide as sound a substrate as possible for install of the fluid applied material.
 - Apply necessary primer to roof system in locations where fluid applied material is to be installed. Primer should only be applied to locations where base coat and fabric can be covered in that day of work.
 - Install application of fully reinforced (polyester fabric) into urethane based base coat, applied at 3 gallons per square.
 - The qualities of a self-terminating system will allow for a good bond without having to do entire roof areas. If both flashings and field of roof can be treated, that will offer the best chance for long-term waterproofing.
 - If a top coat is applied, that will add to the cost of the project, but will provide superior waterproofing.
 - This method of repair does not qualify for a warrantable solution but will work as temporary waterproofing. If all compromised insulation is removed in a certain roof area, new membrane installed, primer, base coat, fabric, and top coat is applied, long term warrantable solutions could be available.
- ❖ ***Tremco Roofing's subsidiary company, Weatherproofing Technologies, Inc. specializes in the application of the aforementioned scope of work. Once areas are prioritized by Amesbury School District personnel, a proposal can be provided for consideration with this repair work.***

Example of Fluid Applied Restoration Process



Fluid Applied Roofing: After compromised insulation is removed, the substrate is power washed and primer applied, a base coat application of fluid applied product is applied to the existing (or new) roofing system.



Fluid Applied Roofing: Reinforcing fabric is set in the base coat layer, to bridge seams and provide waterproofing protection to the roof system.



Fluid Applied Roofing: Overview of the application of reinforced base coat.



Fluid Applied Roofing: In fluid applied roofing, the flashing is done first to provide seamless/continuous waterproofing.



Fluid Applied Roofing: After the base coat and flashing are completed, a uniform top coat is applied to complete the fluid applied system.



Fluid Applied Roofing: Completed fluid applied roof area.

We appreciate the opportunity to be of service. If you have any questions or concerns, please feel free to contact me at any time.

Respectfully,
Matthew Nolan

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